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deemed of some importance to those interested in studying the "Beginnings of Life." It is not an infrequent occurrence for the pulp, or nerve and accompanying vessels, within the tooth to become devitalized without any loss of the hard tissues from dental caries or otherwise. The loss of vitality and necessary disintegration of this peculiarly vascular tissue, results invariable in the formation of pus and gas.

Upon opening into several such cavities they were, as is usual, found to be extremely offensive from this degenerated matter. On examining this putrid material with the microscope, living organisms, resembling what have been described and figured as *Bacteria* and *Vibrios*, were observed in large numbers. Their presence in these cavities, secluded as they were from any contact with the atmospheric air or secretions of the mouth, must be accounted for in one of two ways, viz.: The embryonic germs of these organisms must be universally disseminated, not only throughout this vascular tissue, but also the various textures of the body, by means of the circulating fluid, there to develop and manifest themselves whenever these higher tissues are on the eve of death and degeneration—or else it must be that when the vitality of this vascular tissue is on the wane, its constituent particles are capable of individualizing themselves and of growing into the low organisms in question.

JUNE 8.

The President, Dr. **RUSCHENBERGER**, in the chair.

Twenty-five members present.

On Samarskite.—**JOSEPH WILLCOX** called attention to a mineral specimen (samarskite) presented by him, which was found at a locality discovered by him recently among the mountains in Mitchel Co., North Carolina. Excepting in North Carolina, this rare mineral is only found in the Ural Mountains in Asia. According to Dana's Mineralogy, the largest specimens found at the latter locality are only as large as hazel-nuts; but Mr. Willcox said he obtained a specimen in North Carolina that weighs more than twenty pounds. It was associated with decomposed feldspar.

The Geology of New Mexico.—Prof. **COPE** stated that the ground covered by the geological investigation conducted mainly in New Mexico during 1874 in connection with the Wheeler U. S. topographical and geological survey, embraces the eastern slope of the Rocky Mountains from Pueblo to the Sangre de Christo Pass; both sides of the Rio Grande Valley from that point to Algodones, N. M.; the western or Sierra Madre range, and the country for forty miles to the westward of it, from the latitude of Sierra Amarilla as far south as the road from Santa Fé to Fort Wingate.

Little of novelty has been added from the first two named regions, as they have been previously traversed by competent geologists; but the last named has remained up to the present time almost unknown. The analysis of the structure of the Sierra Madre range is believed to indicate that its elevation took place near the close of the period known as Cretaceous No. 4, and that the elevating force was in New Mexico, more powerful at its southern extremity than along the middle portions of its line. Another important discovery is the lacustrine character of the triassic beds which form a part of the axis of the range; indicating the existence of extensive areas of dry land at that period, of which no portion is remaining in the region examined by me, but which may be supposed to be represented by the palæozoic beds further south and west. A third important point is the determination that the plateau drained by the eastern tributaries of the San Juan River is composed of the sediment of an extensive lake of Eocene age, which was probably at one time of great extent, but whose deposits have been greatly reduced in extent through erosion. The boundaries of this lake to the east and south were determined.

It is believed that additional light has been thrown on the question of the age of the Galisteo sandstone; and that its paleontology has decided definitely that of the Santa Fé marls. The first fossils discovered in the "trias" of the Rocky Mountains, have enabled me to reach more definite conclusions as to its position in the scale of periods.

The remains of vertebrata obtained from the latter formation are those of fishes and reptiles. The former are rhomboganoid scales of small species which are numerous in the coprolites of the reptiles; the latter represent the three orders of *Crocodiles*, *Dinosauria*, and apparently of *Sauropterygia*. The dinosaurian order is represented by a part of the crown of a tooth of a species of large size, of the general character of *Laelaps*. Both faces are convex, the one more so than the other, and the long axis of the crown is curved towards the less convex side. Both cutting edges are sharply and closely crenate denticulate as in *Laelaps*, *Aublysodon*, etc.; otherwise the enamel is perfectly smooth. There was not enough of this animal discovered to enable me to identify it. The suspected sauropterygian species is represented by a single vertebra with the centrum slightly depressed, circular section, and about as long as wide. The neurapophysis appears to have been united by suture, although this point is not so clear as desirable, and the bases of the diapophysis are very stout, extending the entire length of the upper half of the lateral surface of the centrum. Of the articular faces, one is much more concave than the other. Length of centrum, m. .05; width, .057; depth, .055. The crocodilian remains consist of a portion of a jawbone with alveoli for four teeth, of a broken vertebra, and a number of dermal-scuta and fragments of other bones. At another locality not far distant, were found numerous remains of saurian bones, embracing dermal and cranial pieces, coprolites, a fragmentary tooth, etc., which may have some affinity to these. The species indicated by the former may be named and described as follows:—

TYPOTHORAX COCCINARUM, Cope, genus et species nova.

Character genericus. The fragment of jaw belonging to this genus is probably maxillary in position, for the following reasons: the interior face of the bone is sutural, and for the most part solid. This would refer it to the position of the symphyseal portion of the dentary bone of a gavial-like form, but for other considerations. Supposing the piece to be dentary, and the suture therefore vertical, the incongruity follows that the alveolar face becomes very steep, so much so as to prevent the interlocking of the teeth, which become lateral in position. If, however, the jaw fragment be reversed in position, and the alveolar face placed in a horizontal position, the suture of the inner side forms a sharp angle with the vertical plane, as it should on the supposition of its being the maxillary bone. The wedged-shaped section necessary to fill the space between it and the median plane, will then be that of the prolonged posterior spine of the premaxillary bone. The solidity of this portion of the muzzle is inconsistent with the gavial genera of the Jura and later times, but not with the structure of the triassic Belodons. The posterior part of the inner face is, however, strongly excavated, and the sutural margin exhibits an outward deflection, which is either the boundary of the nostril, or the suture for the apex of the prefrontal or nasal bone. In either case the nasal cavity and the nostril are posterior in position in conformity with the structure of the "thecodont" crocodilia. The alveoli are large and arranged in a curved line, one of them somewhat exterior in position and isolated by a short diastema like a canine. Surface of the bone pitted. The dermal scuta found close to the jaw fragment have a flat upper surface marked with shallow pits rather closely placed, having resemblance to an obsolete Trionyx sculpture. Near one of the margins of the bone, the pits run out in shallow grooves. A portion of a vertebral centrum found with the jaw exhibits one articular face; this is shallow, concave, of the type of the Amphicoelian division of *Crocodilia.* The body of the centrum is much compressed.

The other remains include a portion of a dermal bone like those described, and the crown of a tooth among other fragments. This crown, which has lost most of its enamel, is triangular in section, and somewhat curved in its long axis. A convex face is directed forwards and outward (on the supposition that the tooth is superior), and a nearly plane face posteriorly. The inner face is worn flat by the attrition of an opposing tooth. The pulp-cavity is minute or wanting.

Char. specif. The pitting of the maxillary bone is not linear, and is sometimes round; it is rather remote. The outside of the bone is steep, indicating that the muzzle is not depressed. Its face is swollen opposite the supposed canine tooth. The alveolæ are round, and longitudinally oval. The alveolar face is decurved near the end of the muzzle. The superficial layer of the cranial and dermal bones is dense and fine grained. The second series of specimens, whose reference is by no means certain, but which contains a dermal bone like that of the type, includes fragments apparently of the upper surface of the cranium. This is marked with irregular tuberosities and excavations resembling that seen in the Belodonts of the Carolinian and Würtembergian Trias. A section of a narrow dermal bone displays an elevated obtuse median keel, the only bone which displays this form in the collection, the usual form being either flat or slightly concave. Accompanying the same, are numerous coprolites, which are apparently too small for an animal of the dimensions of the type specimen. They are slender, and display rectal folds, which do not exhibit a continuous spiral. They are found, wherever fractured, to be filled with the rhomboganoid scales of some small fish.

Measurements.		M.
Length of fragment of maxillary		.095
Depth (oblique) at ? nostril		.050
Depth (vertical) "		.045
Width (median) "		.025
Width at front alveolus		.035
Diameter canine alveolus		.015
Diameter of another alveolus		.011
Diameter centrum (? caudal) vertebra	transverse	.024
	vertical	.022
Thickness of dermal shield		.008
Measurement across four fossæ of do.		.020
Diameter of crown of tooth No. 2		.018
Length of coprolite of No. 2		.045
Diameter " "		.011

The flat and regularly pitted dermal bones distinguish this genus from *Belodon*. The species was of large size, the cranial fragments equalling corresponding portions of the Gangetic gavial.

The evidence derived from the *Typothorax coccinarum* is favorable to the identification of this horizon with that of the Trias, although it cannot of course be regarded as conclusive, until more perfect specimens are obtained.

Besides the overlying sandstone bed, the red marls are traversed below it by a conglomerate, which is in some places of a bluish tint. At some points it weathers to gravel, and near this horizon the vertebrate remains occur.

In review I give the following section of the Eocene rocks of the region west of the Sierra Madre range:—

Red and gray marls	Wahsatch Group	1500
Sandstone		1000
Green and black marls—Puerco group		500
		3000

The following is an approximate estimate of the mesozoic beds in the same region; as they were not accurately measured, the numbers will have to undergo revision; their relative thickness is nearly as given:—

Uncertain (concealed in the sage plain)	500
Cretaceous No. 4	1500
Cretaceous No. 3	400
Cretaceous No. 2	1500
Cretaceous No. 1	500
Jurassic	600
"Trias" (bottom not seen)	1000
Total	6000

The mesozoic beds of this section (excepting some of the higher members of the cretaceous) have been examined over extensive areas to the west and south, by Messrs. Marcou and Newberry, whose valuable reports accompany those of Lieutenants Whipple and Ives, on the routes surveyed by them through Arizona and New Mexico. The horizon here termed, after Hayden, "Triassic," has been referred to this formation by Marcou also, who had the opportunity of examining it in Texas and the Indian Territory. So far as the latter region is concerned, I can confirm the identification, having examined bones from the red beds of that country, which appear to be those of Belodonts. Dr. Newberry terms it, in Arizona, the "salt group," or "saliferous sandstones," referring to it as probably including both Triassic and Permian strata.

The formations here called jurassic are partially included by Marcou in his triassic series; and are termed the "variegated marls" by Dr. Newberry, who is inclined to refer them to the jurassic.

Dr. **LeConte** inquired, at what line of latitude the observations of Mr. Cope had been made. Mr. Cope replied that the section was made at about the 36th degree.

Dr. LeConte then remarked that the observations of Mr. Cope, with a single exception of the locality of fossils mentioned, which was new, confirmed entirely the observations made by himself in 1867; the arrangement of the older beds further south was, however, less simple than that indicated on the blackboard by Mr. Cope. Underneath the red triassic beds mentioned by Mr. Cope was a very thick bed of hard, white sandstone of Permian age, which bore a deceptive resemblance to Cretaceous No. 1, but which along the Pecos River contained an abundance of *Calamites*, and other characteristic plants. Below this white sandstone was a large mass of deep-red sandrock containing fossil shells badly preserved and lying upon the carboniferous limestone, which had been seen by Mr. Cope.

These facts all went to establish the view expressed by Dr. LeConte in his report in 1867, viz.: the greater complication of the older formations to the south and west, of the intercontinental gulf which in previous geological periods divided the Chippewyan from the Appalachian subcontinent.

Corresponding to this, the older rocks became more simple towards the north, while the subdivisions of the newer formations were greatly increased in number, as the gulf became gradually shallower and was converted finally into a fresh-water lacustrine region.

JUNE 15.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-two members present.

Fruiting of double Peaches.—Mr. MEEHAN exhibited some branches of peach, in which the young fruit were in twos and threes from one flower. They were from the Chinese double-flowering kind. He remarked that, as is well known, plants with double flowers were rarely fertile. Either the stamens were wholly changed to petals, or the less vital conditions which always accompanied this floral state, were unequal to the task of producing perfect pistils. Vitality, however, was more or less affected by external conditions, independently of the mere structure of organs, and this was well illustrated by the remarkable fertility of the peach this season. Usually large numbers of fruit fell without "setting," as it is technically called by orchardists, not because there was any defect in the organs of reproduction, but from lack of vital force to accomplish so much. This season many more had continued, than had been known for many years, and the prospect was for an immense crop of fruit. This abounding vitality had evidently extended to the double peaches, and had influenced the development of the female organs to an unusual extent.

The facts had an interest in botanical classification. The late Professor Lindley had removed the cherry, plum, peach and allies, from Rosaceæ, chiefly because they had but a single, free carpel, and had grouped them as Drupaceæ.

The production of two and three carpels in this case showed the true relation, and might be of use to those interested in "theories of descent."